

C-290

PLAINTIFF'S
EXHIBIT
DUP-1012

CASE HISTORY 5

MANVILLE TEXTILES PLANT

We have chosen to review our dust control efforts at this location in order to demonstrate the difficulty of controlling asbestos fiber emissions in asbestos textile manufacturing operations.

The Manville textile operation began about 1920. Dust surveys to determine asbestos dust levels in the plant were performed intermittently from the mid 1930's to the mid 1950's by industrial hygienists from our insurance carriers. Unfortunately, no records of these survey results presently exist.

In 1958, Johns-Manville established an industrial hygiene laboratory at this location. The initial survey to monitor asbestos dust levels in the textile operation was done that year, using the impinger technique. Results of this first J-M survey were:

<u>No. of Work Stations Monitored</u>	<u>No. above TLV of 5 mppcf</u>	<u>High mppcf</u>	<u>Low mppcf</u>
203	36	27.2	0.4

As a result of this survey, programs were undertaken to reduce exposure levels. These programs were directed at improving existing manufacturing equipment by such means as increased dust control facilities, added vacuum cleaning systems, and revised work practices. By the yardstick of the period, our efforts were successful. Our last survey by the impinger method done in 1968 had the following results:

<u>No. of Work Stations Monitored</u>	<u>No. above TLV of 5 mppcf</u>	<u>High mppcf</u>	<u>Low mppcf</u>
157	1	6.1	0.2

In February 1969, we made our first industrial hygiene survey at this location utilizing the membrane filter/personal air sampler monitoring technique. The results astounded and dismayed us. They were:

<u>No. of Work Stations Monitored</u>	<u>No. of Stations over ACGIH proposed TLV of 5 f/cc</u>	<u>High f/cc</u>	<u>Low f/cc</u>
89	80	32.9	1.7

We immediately instituted a program to further reduce airborne concentrations of asbestos fibers. The first step was the forma-

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tion of a task force which included representatives from plant management, environmental control, industrial engineering and general plant engineering. Much effort including numerous false steps, were expended during the course of the next four years. By the end of that period we had reduced the fiber counts to levels generally below 2.0 f/cc. This achievement required:

1. Approximately \$2,000,000 in capital funds.
2. Approximately \$4,000,000 for design, engineering and experimental work.
3. Reduction in plant capacity from 2,000 tons per year to 750 tons per year.
4. Reduction in employees from 300 to less than 80.

One of the major steps that enabled us to generally reduce TWA airborne concentrations of asbestos to 2 f/cc, was the adoption of "damp" manufacturing techniques. The product made by this method is considered inferior to the dry process material for many uses. Therefore, Johns-Manville decided to produce only those textiles which we would convert, "in-house", in later manufacturing stages, into gaskets and mechanical packings. This decision resulted in the drastic reduction in production capability and number of employees.

In developing our damp processing method we made the following major operating changes:

1. Fiber blending
 - a. Eliminated the operation.
2. Carding
 - a. Rebuilt the carding machinery to permit direct introduction of asbestos fiber and precise blending of the asbestos with a formed lap carrier yarn.
 - b. Installed a system for recovering all extraneous waste asbestos fibers and routing them back into the carding system.
 - c. Provided for the insertion of an organic or inorganic reinforcing strand at the card condenser.
 - d. Installed equipment to apply an aqueous wetting agent to the formed roving.
 - e. Modified the card to wind an enlarged roving package.

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3. Spinning

- a. Eliminated the operation.

4. Twisting

- a. Developed a method for twisting multiple strands of carded roving with reinforcing inserts.
- b. Installed equipment to apply a lubricant and a dust suppressant wetting agent to the yarn.

5. Weaving

- a. Revised the weaving operation to include direct application of dust suppressant wetting agents to the warp and fill yarns.

6. General

- a. Greatly enlarged operating area per machine

Despite this major program to improve working conditions in our textile operation, we have achieved the proposed 0.5 f/cc exposure limit at only 55% of our work stations. The present status is:

<u>No. of Work Stations Monitored</u>	<u>Fiber Levels</u>			
	<u>Less than 0.5</u>	<u>0.5-2.0</u>	<u>2.0-5.0</u>	<u>Greater than 5</u>
49	27	21	1	0

We believe that our Manville textile operation is the most technologically advanced (insofar as control of worker exposure is concerned) operation in existence today in the United States. The only modification known to us would be the adoption of the wet, or liquid dispersion, process for yarn formation. However, this would not significantly improve conditions at the "downstream" operations.

At this point in time, we do not know what technology - at what cost, or what implementation time - could be developed that would enable the asbestos textile industry to meet a Permissible Exposure Limit of 0.5 f/cc.

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BUILDING SYSTEMS

Basic Description

Asbestos-Cement Sheet - This product is a durable, flexible fire-resistant panel used in many industrial and commercial building applications. It is frequently laminated to different core materials and used as sound deadening, fire resistive interior partitions.

Raw materials utilized are asbestos fiber, Portland cement and sand.

ACE - The ACE product line includes formed and cored asbestos-cement panels and shapes manufactured by an extrusion process. Their prime use is as non-load bearing exterior wall panels in commercial and industrial building construction.

Raw materials utilized are asbestos fiber, Portland cement and sand.

Process Description

Asbestos-Cement Sheet - Bags of asbestos fiber are transported on pallets to the bag opening station. Here bags are manually opened, dumped and disposed under a dust control hood. After fiberizing, the fiber is conveyed to a dry mixer where it is combined with the other raw materials. The raw material mix proceeds to a wet mixer and then to the cylinder type forming machine.

After forming, the sheets are stacked between caul plates and transported to a hydraulic press for "repressing." The next process steps are air cure and steam cure (autoclaving).

The final step in the sheet production process is trimming to size by semi-automatic trim saws.

The current range of airborne concentrations of asbestos fibers to which our employees are exposed, without regard to the use of respirators, in each process step in our asbestos-cement sheet manufacturing facilities, are set forth in Figure 6.

The two problem areas in this operation have been reviewed in other asbestos-cement product segments; they are:

1. Fiber introduction
 - a. Bag opening, emptying and disposal
 - b. Fiber handling

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2. Product finishing

a. Sawing (trimming)

The TWA exposures at the fiber introduction operation range from 0.5 to 2.2 f/cc, with an average of 1.2 f/cc. Further reductions of airborne concentrations of asbestos fibers will require similar undertakings to those described for the asbestos-cement board operation.

Employee exposure levels at the trim saw range from 0.8 to 4.1 f/cc, with an average of 1.9 f/cc. Further reductions of airborne concentrations of asbestos fibers will require:

1. Development of improved mechanical exhaust ventilation systems for the trim saws.

ACE - The ACE production operation is the newest of our asbestos-using manufacturing facilities. It incorporates our latest design of bag opening station, a new wet mixing system, and a highly sophisticated and automated saw line and surface finishing line.

As in other asbestos-cement operations, bagged asbestos fiber is transported on pallets to the bag opening station. Bags are opened, emptied and disposed under a dust control hood. After the opening process, fiber and the other raw materials are combined in a wet mixer.

The combined raw materials are conveyed in "pug" form to the extruder. After extrusion the panels are air cured and steam cured.

The cured panels are conveyed through the saw line where they are cut to length and the finishing line where a surface texture is applied.

The current range of airborne concentrations of asbestos fibers to which our employees are exposed, without regard to the use of respirators, in each process step in our ACE manufacturing facilities, are set forth in Figure 7.

The only process step in this production operation which generates significant concentrations of asbestos fiber is the bag opening station.

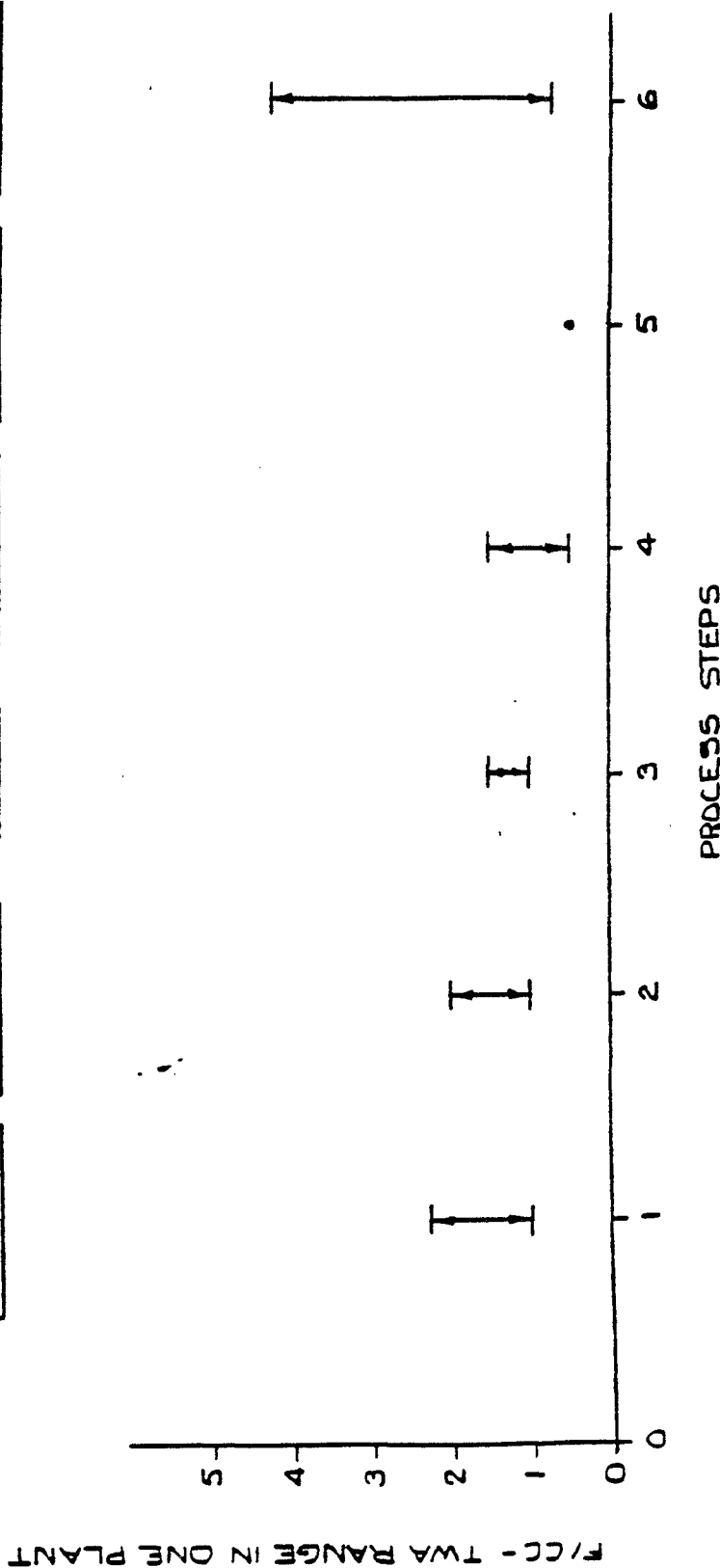
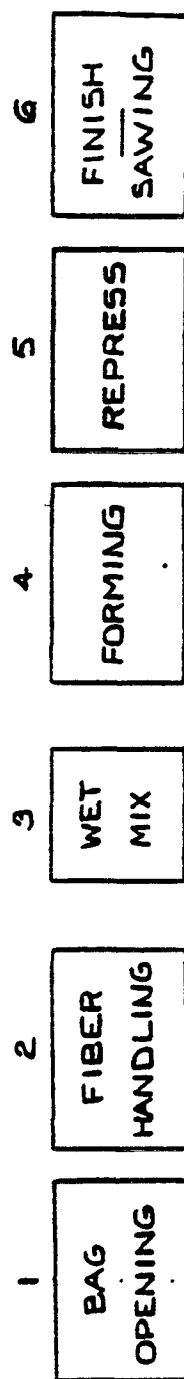
Exposure levels at this process step range from less than 0.5 to 2.2 f/cc, with an average of 1.1 f/cc.

Again, our proposal for reduction in exposure levels is the installation of an automated bag opening system.

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FIGURE 6

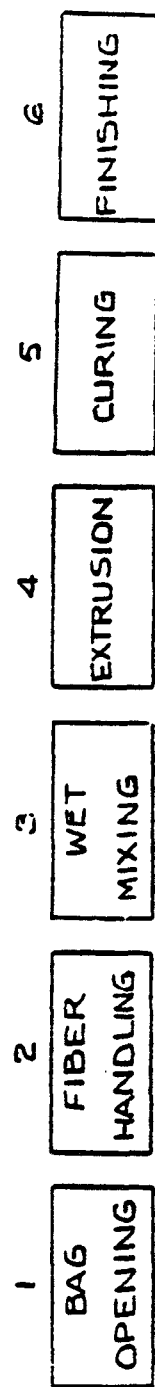
BUILDING SYSTEMS
A/C. SHEET



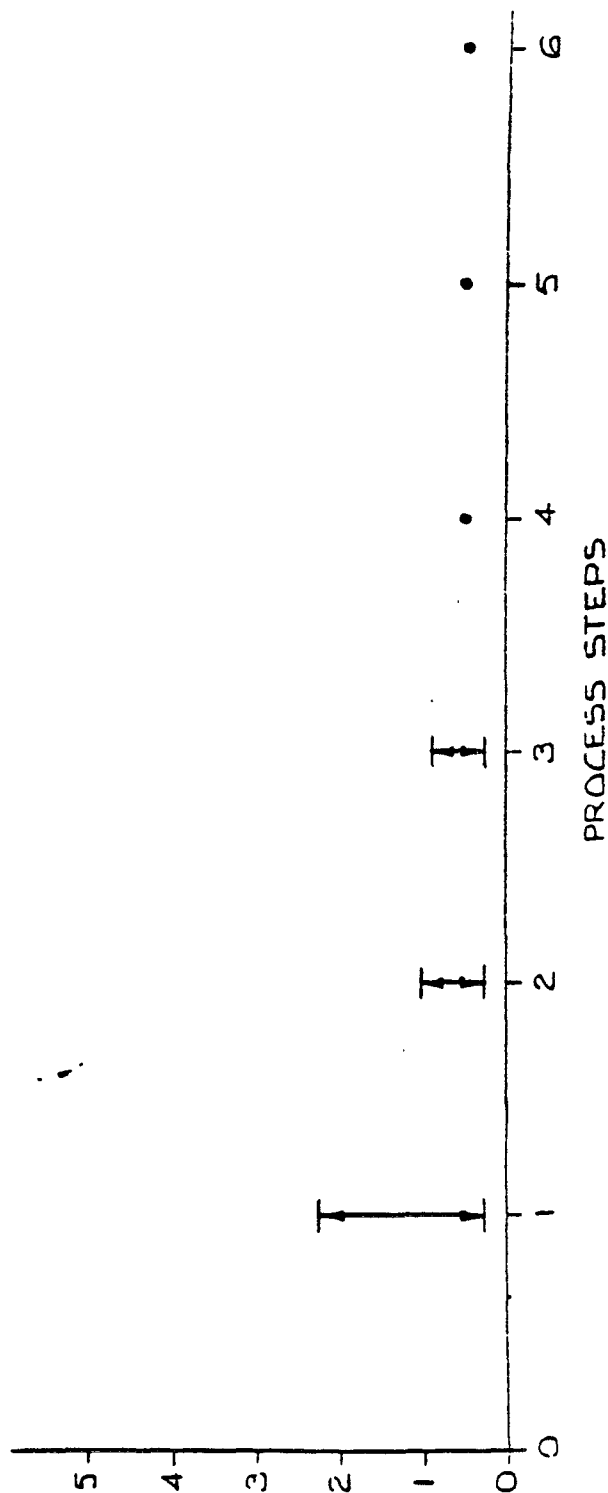
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FIGURE 7

BUILDING SYSTEMS
ACE



F/CC - TWA RANGE IN ONE PLANT



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PAPER

Basic Description

Asbestos-containing papers have a variety of uses.

The coarse papers, often referred to as "felts," are asphalt saturated and are used in "built-up" roofing systems and as pipe line protection wrap.

Electrical insulating papers range from commercial grade to the specialty product made from selected, highly refined fibers. These papers are 85% to 95% asbestos combined with a starch, latex or polymeric binder.

Process Description

Bagged asbestos fiber is transported on pallets to the bag opening station at the beater. The bags are manually opened, emptied and disposed under a dust control hood. The fiber gravity feeds from the opening station directly into the beater. Binder is added at the beater.

The fiber and binder are pumped through the stock preparation system to the wet end of the paper machine (Fourdrinier). The paper is formed and then conveyed through the paper machine dryer section to the wind-up station. Paper is trimmed to width during the winding process. The final step is rewinding of the paper in different size rolls for shipment.

The specialty electrical papers may undergo further processing including coating, laminating and shearing to length.

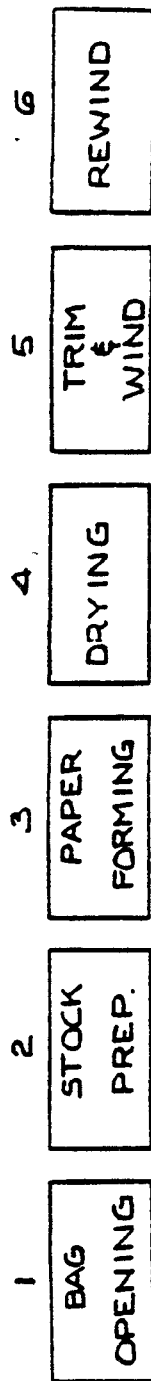
The current range of airborne concentrations of asbestos fibers to which our employees are exposed, without regard to the use of respirators, in each process step in our paper manufacturing facilities, are set forth in Figure 8.

The only process step in this production operation which generates significant concentrations of asbestos fibers is fiber introduction. Present exposure levels range from less than 0.5 to 2.5 f/cc, with an average exposure of 1.4 f/cc.

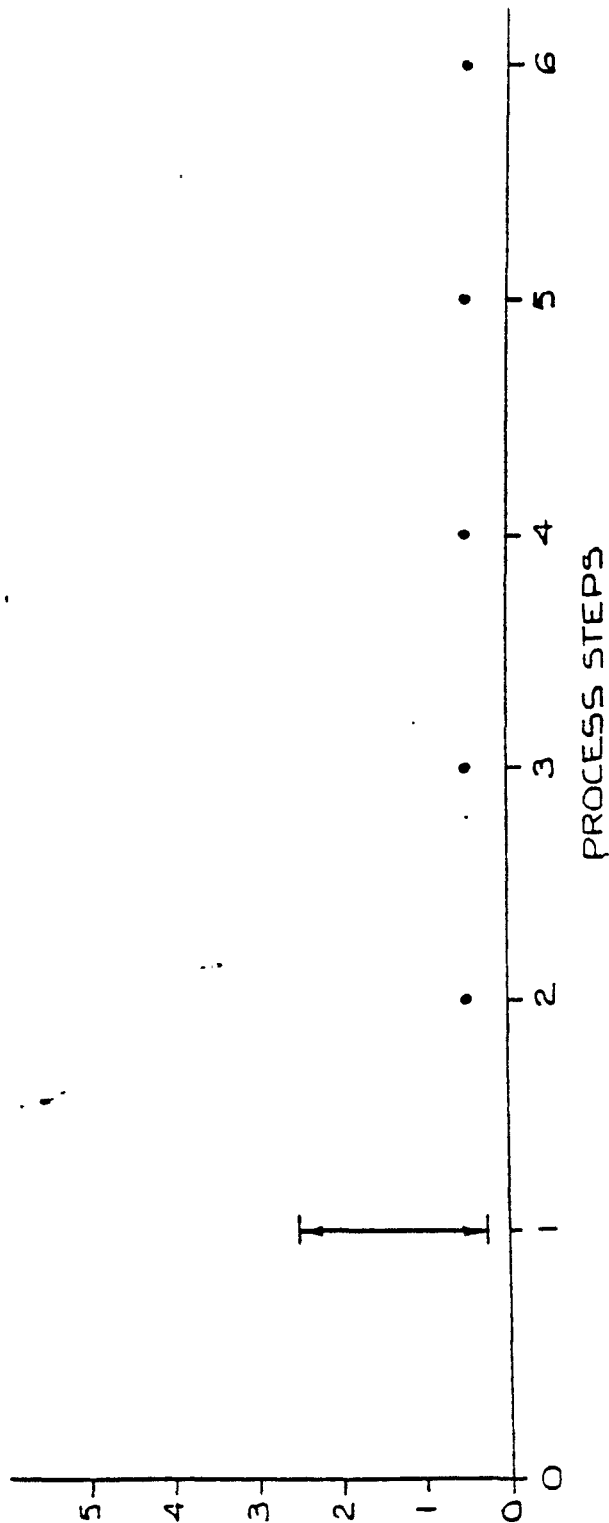
Reduction of these exposures will require the installation of an automated bag opening system, adapted to feed directly into the paper beater.

FIGURE 8

PAPER



F/C C - TWA RANGE IN FUR PLANTS



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